

**STUDY OF THE EFFECTS OF SIZE AND COMPLEXITY OF FINANCIAL
INSTITUTIONS ON CAPITAL MARKET EFFICIENCY AND ECONOMIC
GROWTH**

**PURSUANT TO SECTION 123 OF THE DODD-FRANK WALL STREET
REFORM AND CONSUMER PROTECTION ACT OF 2010**

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January 2011

Table of Contents

I. OVERVIEW	4
Introduction	5
A Brief Historical Background.....	6
Overview of Costs and Benefits of Financial Regulation	7
The Nature of this Study.....	8
II. REVIEW OF POSSIBLE LIMITATIONS REQUIRED BY SECTION 123.....	9
Section A: Costs and Benefits of Explicit or Implicit Limits on the Maximum Size of Banks, Bank Holding Companies, and Other Large Financial Institutions	9
Review of the Literature	10
Summary.....	12
Section B: Costs and Benefits of Limits on the Organizational Complexity and Diversification of Large Financial Institutions	14
Review of the Literature	15
Summary.....	17
Section C: Costs and Benefits of Requirements for Operational Separation Between Business Units of Large Financial Institutions in Order to Expedite Resolution in Case of Failure	19
Review of the Literature	19
Summary.....	22
Section D: Costs and Benefits of Limits on Risk Transfer between Business Units of Large Financial Institutions	23
Review of the Literature	24
Summary.....	26
Section E: Costs and Benefits of Requirements to Carry Contingent Capital or Similar Mechanisms.....	28
Review of the Literature	30
Summary.....	33
Section F: Costs and Benefits of Limits on Commingling of Commercial and Financial Activities by Large Financial Institutions	35
Review of the Literature	36
Summary.....	38

Section G: Costs and Benefits of Segregation Requirements between Traditional Financial Activities and Trading or Other High-Risk Operations in Large Financial Institutions.....	39
Review of the Literature	39
Summary.....	47
REFERENCES.....	48

I. OVERVIEW

Section 123 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Pub. L. 111-203) (hereafter, “Dodd-Frank Act”) calls on the Chairperson of the Council to carry out a study of the economic impact of possible financial services regulatory limitations intended to reduce systemic risk and to make recommendations regarding the optimal structure of any limits considered. This report has been prepared in response to this mandate. The following introduction section provides a brief discussion of the rationale for financial regulation, the history of financial regulation in the United States, and the potential costs and benefits of regulations; it also outlines the scope and limitations of this study.

The subsequent sections address potential costs and benefits of particular types of financial regulations. Each section is devoted to a topic identified in Section 123. Section A discusses explicit or implicit limits on the maximum size of banks, bank holding companies, or other large financial institutions. Section B discusses limits on the organizational complexity and diversification of large financial institutions. Section C discusses requirements for operational separation between business units of large financial institutions in order to expedite resolution in case of failure. Section D discusses limits on risk transfer between business units of large financial institutions. Section E discusses requirements to carry contingent capital or similar mechanisms. Section F discusses limits on commingling of commercial and financial activities by large financial institutions. Finally, Section G discusses segregation requirements between traditional financial activities and trading or other high-risk operations in large financial institutions.

Section 123(a)(1)(H) also calls for the study of the benefits and costs on the efficiency of capital markets, on the financial sectors, and on national economic growth of other limitations on the activities or structure of large financial institutions that may be useful to limit systemic risk. The Dodd-Frank Act contains many provisions designed to help limit systemic risk, some but not all of which are discussed in this study. Most of these provisions, however, are or will be the subject of rulemakings by the responsible regulatory agencies, who typically have substantial statutory discretion to determine how to implement these provisions. Given the significant number of provisions in Dodd-Frank that provide regulators with new authority to adopt conditions or limitations on large financial institutions which have not yet been proposed or implemented, it is not possible at this time to assess the effectiveness of these changes and whether additional limitations would be useful. As such, the study recommends that this consideration should be addressed in the next periodic study required by Section 123, which is due in 2016.

INTRODUCTION

A healthy financial system is essential to economic growth and stability. By mobilizing savings and channeling funds to borrowers, the financial system promotes investment in plant and equipment, new technologies, human capital and housing. Banking institutions (including commercial banks, credit unions, thrifts and bank holding companies; hereafter “banks”) perform two special roles in the financial system. First, they engage in *maturity transformation* by investing in long-term, illiquid assets created by borrowers and issuing short-term, liquid liabilities to investors. Second, they *allocate credit*, using their expertise in screening credit risk ex-ante and monitoring borrower behavior ex-post to help direct credit flows to the highest valued uses.

Because banks and other financial institutions (including securities firms, investment banks and other financial intermediaries; hereafter “FIs”) are so important in creating credit flows, adverse shocks to FIs can have an outsized impact on the overall economy. Actual insolvencies and investor panic triggered by insolvency concerns played important roles in triggering the recent recession, as well as recessions in 1893 and 1907 and the Great Depression in 1929.

An under-regulated financial system is prone to excessive instability. By its nature, maturity transformation exposes banks to credit risk and liquidity risk. In the absence of regulation, investors have incentives to monitor bank behavior and withdraw funds from institutions that are viewed as being too risky. This market discipline encourages banks to limit risk and to hold adequate buffers of capital and liquid assets. However, from a public policy perspective, banks tend to carry too much risk in an under-regulated system because they do not internalize the external costs that their distress imposes on the financial system. For example, if a bank is forced to sell illiquid assets quickly, other banks holding similar assets would experience mark-to-market balance sheet losses. As another example, failure of one bank typically triggers investor concerns about solvency of other banks that hold similar assets or are counterparties to the failed institution. Such concerns can trigger liquidity runs and systemic turmoil. However, banks do not incorporate these external costs when weighing the marginal benefits and costs ex-ante of holding additional capital or liquidity.

The need to limit systemic risk is a compelling rationale for financial regulation. Public credit guarantees and liquidity provisioning—such as deposit insurance and access to the discount window—are essential backstops for preventing bank runs. However, such backstops inhibit the incentive of investors to monitor bank behavior. Absent market discipline, banks will be emboldened to take on more risk, expecting that some of their downside risk will be borne by taxpayers. Public backstops must thus be accompanied by regulations, such as limits on activities and minimum capital requirements. Of course, poorly-designed regulations can stifle competition and innovation or create inefficiencies in credit allocation. Financial regulation must strive to limit systemic risk while not hindering efficient financial intermediation.

A BRIEF HISTORICAL BACKGROUND

Historically, the U.S. financial system has undergone increasing levels of regulation over time. The National Bank Act of 1863 generally limited the types of activities that could be conducted by national banks to those that are part of, or incidental to, the business of banking. The McFadden Act (1927) limited interstate branch banking, implicitly limiting bank size and geographic diversification. The Banking Act of 1933 (known as Glass-Steagall) separated commercial banks from investment banks. Commercial banks could not underwrite securities, while securities firms could not engage in commercial banking. The Bank Holding Company Act of 1956 prohibited banks from affiliating with companies engaged in commercial activities.

However, beginning in the late 1960s, innovation and deregulation gradually eroded these restrictions. Commercial banks lost market share to new financial instruments and institutions such as commercial paper and money market mutual funds. In response, banks were allowed to expand and diversify their activities. The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 significantly eased interstate banking restrictions. The Gramm-Leach-Bliley Act of 1999 expanded the range of financial activities that may be conducted by qualifying banking organizations.

The early 2000s saw the rise of large, complex FIs engaged in a broad spectrum of financial activities, as well as the rise of a new model of financial intermediation, referred to as shadow banking, in which maturity transformation increasingly took place outside the formal banking sector. In this new model, illiquid and (sometimes) risky assets were funded by asset-backed commercial paper or loans financed by repurchase agreements (repo loans) collateralized with asset backed securities; credit and liquidity backstops of liabilities were implicit rather than explicit; and capital requirements and other restrictions were less stringent for shadow banks than for traditional banks.

Inadequate regulation played a major role in the recent crisis. The Dodd-Frank Act addresses this failure. It establishes the Financial Stability Oversight Council (“FSOC”), which may designate for supervision by the Board of Governors of the Federal Reserve System (“Federal Reserve”) any financial firm whose material financial distress could pose a threat to the financial stability of the United States. The Dodd-Frank Act provides for the establishment of enhanced supervision and prudential standards for nonbank financial companies designated for supervision by the Federal Reserve and bank holding companies with assets equal to or greater than \$50 billion. The Dodd-Frank Act creates comprehensive federal oversight of the derivatives market and imposes safeguards and transparency on the process of securitizing pools of loans for investors. The FSOC also has clear accountability for identifying emerging threats to financial stability and coordinating regulators’ efforts to address such threats. To protect the taxpayer, the Act restricts commercial banking firms from engaging in proprietary trading or investing in or sponsoring private equity or hedge funds (the Volcker Rule). The Federal Reserve is provided

authority to require nonbank financial companies designated for supervision by the Federal Reserve, and bank holding companies with assets of \$50 billion or more, to reduce their size or divest business lines if the company poses a grave threat to the financial stability of the United States. In the event a major financial firm fails, the Dodd-Frank Act supplies the federal government with authority to wind it down in an orderly fashion that protects the economy and does not impose the cost on taxpayers.

OVERVIEW OF COSTS AND BENEFITS OF FINANCIAL REGULATION

The subsequent sections of this report address the potential costs and benefits of particular types of financial regulation. Before proceeding, we articulate the two main channels through which financial regulation can affect the economy.

First, regulations can affect the *supply and cost of credit*. Regulation affects credit supply in part through its effect on *allocative efficiency*. Ideally, the financial system should equalize the marginal social benefit of credit across different borrowers, and should equalize the marginal benefit of credit to its social marginal cost. Financial regulation can promote allocative efficiency by narrowing differences between marginal costs and marginal benefits, but it can also exacerbate such differences. For instance, policies that combat discrimination and promote fair market practices can improve allocative efficiency by eliminating artificial gaps between price and marginal cost, while policies that artificially limit entry (such as restrictions on branching) can lead to market power distortions that push the price of credit above its marginal cost. It is important to note that promoting allocative efficiency does not always reduce the cost of credit. If credit is priced below its social cost, regulation should aim to raise the price of credit. Regulation can also affect credit supply through its impact on *technological efficiency*. Regulations that prevent innovation or preclude FIs from achieving economies of scale or scope may increase the cost of credit.

Second, financial regulation can affect the *riskiness* of individual FIs and the financial system as a whole. As mentioned above, FIs may take on too much risk because of their failure to account for costs imposed on other institutions in the event of distress, and this tendency is magnified when public backstops reduce market discipline. Reducing default risk reduces the expected cost of resolutions and benefits the economy by making systemic financial crises less likely. Therefore, regulations that reduce excessive risk can benefit the economy. However, poorly designed regulations may unintentionally increase risks. For example, restrictions that are imposed only on formal banks may encourage the growth of lightly-regulated shadow banks that are more vulnerable to runs.

THE NATURE OF THIS STUDY

A few points about the nature of this study are in order. First, this study does not evaluate the costs and benefits of the Dodd-Frank Act. While the Act has undoubtedly had a significant effect, it is too soon to attempt to quantify its aggregate impact let alone the specific impact of various provisions within certain channels of our financial system. Instead, this study contains a critical review of existing research on the impact of the types of financial regulation identified in Section 123. Most of this research was conducted prior to the enactment of the Dodd-Frank Act, and thus does not comment directly on the Act, although some of the reported findings are indicative of the potential benefits of particular provisions of the Act.

Second, this study will in general refrain from making specific quantitative assessments. Section 123 calls for follow-up studies every five years. This study recommends that the periodic study due in 2016 consider the experience of implementing the Dodd-Frank Act and any further original research, and consider making more specific recommendations.

This study is confined to the existing literature, in which some topics are addressed more thoroughly than others. For instance, the discussion of limits on bank size draws on an extensive literature on economies of scale in banking; however, there is much less existing literature on contingent capital requirements. In some cases, literature is sparse because there is little real-world experience with certain types of regulation; in other cases, necessary data are not available. When appropriate, the report will identify specific topics for which additional research and additional data would be especially valuable.

II. REVIEW OF POSSIBLE LIMITATIONS REQUIRED BY SECTION 123

SECTION A: COSTS AND BENEFITS OF EXPLICIT OR IMPLICIT LIMITS ON THE MAXIMUM SIZE OF BANKS, BANK HOLDING COMPANIES, AND OTHER LARGE FINANCIAL INSTITUTIONS

This section discusses the costs and benefits of limits on the size of banks, bank holding companies, and other large financial institutions, hereafter collectively referred to as financial institutions (FIs). The costs and benefits of such limits depend on the importance of scale economies, large FIs' ability to abuse market power, and market perceptions that large FIs have access to a government safety net.

The potential cost of limits on the size of FIs is that such limits may prevent FIs from achieving economies of scale and benefiting from diversification.

One potential benefit of limits on the size of FIs is that such limits may prevent FIs from acquiring market power and abusing it by setting prices at socially inefficient levels. Another possible benefit of such limits is that they may prevent FIs from growing so large that they are perceived by the market as "too big to fail." Limiting the perception that some FIs are "too big to fail" will constrain excessive risk taking by preventing the moral hazard associated with the perceived access to a government safety net.

Prior to the advent of interstate banking, U.S. commercial banks faced functional limitations that generally prevented them from growing too big. The Riegle-Neal Act of 1994 removed many barriers to interstate banking but imposed a concentration limit on commercial banks, based on the share of insured deposits held by the bank. The Dodd-Frank Act eliminates some existing limits on branching and imposes an additional concentration limit on the financial sector by preventing any financial company from conducting a merger or acquisition that would result in the financial company accounting for more than ten percent of the liabilities of the financial sector. The Dodd-Frank Act requires the FSOC to release a report, together with a recommendation, regarding the implementation of this concentration limit. Following the release of this report, the Federal Reserve will adopt regulations to implement this concentration limit.

The concentration limit in the Dodd-Frank Act is an example of a restriction that may help prevent FIs from becoming so large that they are perceived by the market to be "too big to fail," and may also constrain FIs from acquiring market power. Concentration limits work with other provisions in the legislation, such as the orderly liquidation authority of Title II, to protect

taxpayers. The effectiveness of these limits will depend on implementation, how they interact with other regulations, and on FI responses to the regulations.

REVIEW OF THE LITERATURE

BANK SIZE AND SCALE ECONOMIES

An increase in the size of a FI could reduce the cost of the credit it provides, because large FIs may benefit from improved efficiency associated with scale economies. One specific type of scale economy is that larger FIs may be more diversified, which could reduce their costs of funding. Accordingly, a potential cost of limits on the size of FIs is that such limits may prevent FIs from enjoying improved efficiency from scale economies, and raise the cost of credit as a result.

The economics literature identifies scale economies by studying the relationship between FI performance (measured by either costs or by profitability) and the size of the FI. Early empirical analysis found limited bank scale economies that tended to peak at relatively low asset levels (see Wheelock and Wilson (2009) for discussion). However, this research was restricted to data from the 1980s and may not have adequately accounted for differences across FIs in their credit production processes (Mester 2005).

Research using more recent data and improved methods finds substantially stronger evidence of increasing returns to scale among FIs. For example, Wheelock and Wilson (2009) estimate that during the period 1984-2006, many commercial banks benefited from increasing returns to scale, regardless of ownership structure and branch banking restrictions (see also Hughes, Mester, and Moon (2001) and Feng and Seriletis (2010)). Much has changed since 2006 and further research is needed to make any conclusions about the current environment. In addition, although research suggests that scale economies do exist for large FIs, there is no consensus on the ‘optimal’ FI size, due to limitations on data availability and research design, and difficulties in measuring costs over a long time horizon. Additionally, there is no clear evidence to indicate that scale economies continue increasing as FIs approach a very large size.

The drivers of efficiency gains in large FIs are multifaceted. Large FIs disproportionately enjoy the efficiency gains from technological progress, such as automated small business credit scoring, because the benefits of the new technology are more likely to outweigh the upfront fixed investment costs for large FIs (Berger, Dick, Goldberg, and White 2007). Another driver is that there may be significant scale economies in implementing either paper-based or electronic-based payment systems (Bauer and Hancock 1993).

Diversification is specifically addressed in Section B of this report. However, diversification also interacts with FI size because larger FIs may be better positioned to diversify risk, and may

be able to access low-cost funding as a result. In this way, diversification represents another way in which large FIs benefit from scale efficiency (McAllister and McManus 1993). Empirical studies have shown that geographic expansion diversifies region-specific risk and tends to reduce FI failures (Hughes, Lang, Mester, and Moon 1996). It is worth noting that reduced costs of funding due to diversification may contribute to large FIs taking on additional risk. Moreover, diversification of large FIs tends to increase their complexity, which may raise their risk management costs, reduce transparency, and complicate resolution.

BANK SIZE AND MARKET POWER

Large FIs in concentrated markets may abuse their market power, leading to elevated credit prices that are socially inefficient. Limitations on the relative size of FIs may prevent high levels of concentration and the socially inefficient pricing of credit.

There is a regulatory history on concentration limits that pre-dates the Dodd-Frank Act. The Riegle-Neal Act of 1994 prohibited interstate mergers that would result in a bank and its branches controlling more than ten percent of national deposits of insured depository institutions or more than 30 percent of insured deposits in a state. Section 622 of the Dodd-Frank Act imposes a concentration limit on the financial sector by preventing any FI from conducting a merger or acquisition that would result in the FI accounting for more than ten percent of the liabilities of the financial sector.

The economics literature generally supports the conclusion that market power contributes to socially inefficient price setting. Bank merger activities that result in dramatic increases in market concentration result in less favorable prices for customers (Prager and Hannan 1999), while other mergers and acquisitions, such as market-extension mergers and acquisitions that unite institutions with little or no geographic overlap, have less effect on retail customers (Simons and Stavins 1998). Jeon and Miller (2005) find that higher concentration at the U.S. state level is associated with higher FI profits. There are some studies that draw different conclusions, such as one study that shows that increased market power may boost cost efficiency (Maudos and Fernandez de Guevara 2006). However, another study suggests that increased market power leads to decreases in efficiency, which may be consistent with FIs abusing market power (Berger and Hannan 1998).

One benefit of limits on the size of FIs is that such limits may prevent FIs from growing so large that they are perceived by the market as “too big to fail.” Limiting this perception will constrain excessive risk taking by preventing the moral hazard associated with the perceived access to a government safety net. Moreover, limiting the relative size of any single financial firm will limit the adverse effects from the failure of any single firm for reasons specific to that firm.

A few studies in the economics literature have focused on how bank size contributes to the perception that a FI is “too big to fail.” Huang, Hao, and Haibin (2010) conclude that bank size is directly related to how the financial market perceives the net impact of the failure of a specific FI on the overall financial sector. Prior to the recent crisis, several studies showed, using data from equity markets and from mergers, that the value of large FIs potentially reflected the market perception that they were “too big to fail,” which may have contributed to increasing their size, reducing their capitalization, and their taking on excessive risk (O’Hara and Shaw (1990), Brewer and Jagtiani (2009)). Another study showed that the ‘issuer ratings’ of large FIs, which determine their financing costs, may reflect a perception that these large FIs are “too big to fail” (Rime 2005). Access to cheap financing contributes to moral hazard, and moral hazard may have been partially responsible for large banks taking on excessive risk prior to the crisis.

A distinct segment of the literature has focused on how concentration may lead to excessive risk taking, potentially through the market perception that certain FIs are “too big to fail.” For example, Boyd, De Nicolo, and Jalal (2006) find that in countries with more concentrated financial markets, FIs have taken on a disproportionate amount of risk, relative to their capital buffer. Other studies have found that more concentrated banking systems actually have a decreased probability of financial crises, potentially due to better diversification of risks within the large FIs (Beck, Demirguc-Kunt, and Levine 2006).

SUMMARY

The costs and benefits of limits on FI size depend on scale economies, large FIs’ potential to abuse market power and whether the market perceives large FIs as “too big to fail.” The economics literature suggests that there are both costs and benefits to limiting bank size.

Some studies examining the relationship between FI performance and FI size find that there are scale economies associated with large FIs. Large FIs disproportionately enjoy the efficiency gains from technological progress and the benefits associated with the ability to diversify risk. Strict limits on bank size therefore could pose a cost to large FIs, which are best positioned to accrue these benefits.

Conversely, there are benefits to limiting FI size. Large FIs in concentrated markets may abuse their market power, leading to elevated credit prices that are socially inefficient. Limitations on

the relative size of FIs may prevent high levels of concentration and the socially inefficient pricing of credit. Section 622 of the Dodd-Frank Act addresses this issue by imposing a concentration limit on the financial sector that prevents any FI from conducting a merger or acquisition that would result in the FI accounting for more than ten percent of the liabilities of the financial sector. Limiting FI size, together with other restrictions in the legislation, also may prevent FIs from growing so large that they are perceived by the market as “too big to fail.” Limiting the perception that some FIs are “too big to fail” will constrain excessive risk taking by preventing the moral hazard associated with the perceived access to a government safety net. Moreover, limiting the relative size of any single financial firm will limit the adverse effects from the implosion of any single firm for reasons specific to that firm.

This study will not make recommendations regarding limits on the maximum size of banks, bank holding companies, and other large financial institutions. Section 123 calls for follow-up studies every five years. The concentration limit under section 622, once implemented, may provide information regarding the costs and benefits of a limitation on size. The study that will be prepared in 2016 may take this information into consideration.

SECTION B: COSTS AND BENEFITS OF LIMITS ON THE ORGANIZATIONAL COMPLEXITY AND DIVERSIFICATION OF LARGE FINANCIAL INSTITUTIONS

This section reviews the existing literature on the effects of increased scope, organizational complexity, and diversification of large financial institutions. Increased organizational complexity and diversification of large financial institutions in the U.S. may have contributed to the recent financial crisis. While internationalization, consolidation and conglomeration offer potential benefits to financial institutions, diversification may also lead to shifts in risk taking behavior and the development of new and more sophisticated mechanisms to transfer risk, which in turn may increase interconnectedness among financial institutions, and therefore, systemic risk.

Some of the benefits of functional diversification (that is, across business activities and markets) and organizational complexity mentioned by the existing literature are: lower risks, better access to internal capital markets, increased supply of financial services, and operational synergies through economies of scope and economies of information. Potential costs include inefficient rent-seeking; bargaining problems and bureaucratic rigidity; intensification of agency problems between insiders and outsiders, between the divisions of the conglomerate, and between the conglomerate firm and its customers; increased systemic risk due to negative externalities and more interdependencies; and higher regulatory costs arising from multiple supervision efforts.¹

Whether the benefits of diversification are larger than the costs cannot be determined from theory alone and is therefore an empirical question. This issue is important because limits on the organizational complexity and diversification of large financial institutions may have important implications not only for risks and market valuation of large financial firms, but also for corporations, households and other financial institutions through the supply of financial services, the sources of credit available to borrowers, and the *allocative efficiency* of capital markets.

The empirical evidence on costs and benefits of diversification and organizational complexity is mixed. On the one hand, more diversified and organizationally complex financial institutions can provide a wider array of financial services, which could improve the *supply of credit* and other financial services. For example, there is evidence for economies of scope in combining deposit taking and lending, the classic commercial banking activities. On the other hand, there is less evidence that other forms of functional diversification create value. The economic literature has raised the concern that more diversified and complex financial institutions may be perceived by the market as “too big to fail,” leading to problems with moral hazard and excessive risk taking.

¹ See Klein and Saidenberg (2010) and Elsas, Hackethal and Holzhauser (2010) for more details and references.

REVIEW OF THE LITERATURE

DIVERSIFICATION

The broad empirical literature on corporate diversification has generally found that conglomerates are less efficient than standalone firms. Most studies find a “diversification discount”: diversified firms trade at a discount relative to a portfolio of comparable standalone firms (see, for example, Lang and Stulz (1994)). The diversification discount found for nonfinancial corporations also seems to be applicable to financial institutions (see, for example, Laeven and Levine (2007), although Baele, De Jonghe and Vander Vennet (2007) find a strong positive correlation between franchise value and the degree of diversification for a sample of European banks).

Demsetz and Strahan (1997) and Stiroh and Rumble (2006) find that potential diversification benefits such as lower risks and a broader range of financial services could be offset by riskier lending portfolios, lower capital ratios, and increased exposure to more volatile non-interest activities (e.g. brokerage or underwriting). Specifically, Stiroh and Rumble find little evidence of gains in risk-adjusted returns from the recent shift toward fee and other non-interest income for U.S. commercial banks. They argue that banks have shifted towards these activities because managers focus more on the benefit of higher expected profits than on the cost of higher return volatility. As they point out, this focus makes sense if managers reap the gains of higher profits, but do not bear all of the costs from increased risk; for example, if managers are equity-holders, they have an incentive to take risk beyond what debt-holders and supervisors would prefer.

Another potential benefit of increased diversification derives from the presence of economies of scope between different activities in the banking industry. Economies of scope provide a rationale for why commercial banks combine the provision of deposits and credit services. As Kashyap, Rajan, and Stein (2002) argue, banks should combine demand deposits with loan commitment lines offered to households and firms as long as the demand for liquidity of these two types of customers is not too highly correlated. Gatev and Strahan (2006) extend this argument and highlight the ability of commercial banks to provide liquidity insurance against systemic liquidity shocks. Using both aggregate and bank-level data, they find that in periods when liquidity dries up and commercial paper spreads widen, banks experience funding inflows in the form of deposits. These deposit inflows allow banks to meet loan demand from borrowers drawing funds from commitment lines without running down their holdings of liquid assets. While the literature suggests economies of scope between deposit taking and loan provision, there is limited evidence for other kinds of economies of scope. An additional potential concern about exploiting economies of scope is that increased diversification may make financial institutions’ organizational structure more complex, which would increase managerial costs.

ORGANIZATIONAL COMPLEXITY

To our knowledge, there is only one existing empirical study that focuses on the benefits and costs of organizational complexity *per se*. Klein and Saldenberg (2010) suggest that existing estimates of the costs of diversification (e.g. the diversification discount) reflect not only the effects of higher diversification itself, but also the effects of more complex organizational structures. The authors' attempt to disentangle these two concepts by looking at the effect on bank holding company (BHC) profitability and market value of having additional separately chartered subsidiaries (which the authors interpret as a more complex organizational structure), controlling for BHC diversification as proxied by size and the number of states in which the BHC operates. They find that BHCs with many subsidiaries are less profitable and have lower market values than similar BHCs with fewer subsidiaries. These differences are statistically significant even after controlling for size, diversification, local market conditions, and the possible endogeneity of the decision to add subsidiaries. Furthermore, the authors argue that the cost of managing complex organizations increases with subsidiary heterogeneity.

SYSTEMIC RISK

On the impact of increased diversification and organizational complexity on systemic risk, De Nicoló and Kwast (2002) point out that increased scope of financial firms' activities, both across countries and across business lines, may lead to increased systemic risk, since a larger fraction of financial firms will become more "complex" to manage, and their interconnectedness (or what the authors refer to as interdependencies) will become more difficult to monitor. They argue that systemic risk depends fundamentally on firms' interdependencies, both direct (e.g. inter-firm on- and off-balance sheet exposures from interbank loans, derivatives, and payment and settlement) and indirect (e.g. potential losses through loan concentrations to the same industry, or otherwise highly correlated portfolios). The authors find that stock returns of large U.S. banks became more positively correlated with one another over the period 1988-1999, suggesting that interdependencies have increased over time. In their view, these increased interdependencies raise systemic risk.

More recent work suggests that diversification of large financial institutions could reduce their individual probability of failure yet increase the probability of a systemic crisis. For example, Wagner (2010) develops a theoretical framework in which diversification makes financial institutions more similar to each other by exposing them to the same risks. Since full diversification requires all institutions to hold the market portfolio, diversification increases the correlation of asset risks across institutions, increasing their chance of failing jointly. While previous work assumes a constant efficiency loss from the liquidation of assets during a crisis, in Wagner's model there are social costs in the form of larger efficiency losses when institutions all have to liquidate at the same time. In such a setup, full diversification is not optimal, because the marginal benefit of diversification (from lower return variance of a portfolio) is declining in the

degree of diversification and becomes zero at full diversification, while the marginal cost of correlated failures increases in the degree of diversification. Wagner concludes that the marginal costs of diversification in terms of more severe systemic crises must outweigh the marginal benefit for a sufficiently large degree of diversification.

De Nicolo, Bartholomew, Zaman and Zeohirin (2004) use data on the 500 largest financial firms worldwide, and on large financial institutions in about 90 countries, and find that complexity resulting from conglomeration and consolidation increases systemic risk (as they define it). In particular, they find that (1) large conglomerate financial institutions exhibited levels of risk-taking no lower than those of smaller and specialized firms in 1995, and exhibited higher levels of risk-taking in 2000; (2) highly concentrated financial systems exhibited higher levels of systemic risk potential than less concentrated systems during the 1993–2000 period, and this relationship strengthened during the 1997–2000 period. As a result, the authors argue that consolidation and conglomeration do not necessarily yield safer financial firms or more resilient financial systems.

SUMMARY

If diversification and organizational complexity have more costs than benefits in terms of more risky activities, lower capital and higher exposure to systemic risk, then limits on diversification could help enhance financial stability and economic growth.

Although some findings are mixed, most of the empirical literature suggests that diversification and complexity expand the supply of financial services and reduce institutions' individual probability of failure, but at the same time shift institutions towards more risk-taking, increase the level of interconnectedness among financial firms, and therefore may increase *systemic* default risk. These potential costs may be exacerbated in cases where the market perceives diverse and complex financial institutions as “too big to fail,” which may lead to excessive risk taking and concerns about moral hazard. The literature thus provides some support for limits on degree or scope of diversification and organizational complexity of large financial firms.

That said, there may well be benefits of organizational complexity and diversification that are not yet addressed in the literature. In addition, it is important to note that little research exists on the effects of specific limits on diversification and organizational complexity (as opposed to research on the costs and benefits of diversification and organizational complexity themselves). For example, the existing literature does not provide meaningful insights into the following questions. Which types of limits would guard against excessive risk taking? Which types of limits are most “cost-effective”? Do such limits have unintended consequences on other aspects of financial intermediation? More research on these topics could be helpful.

This study will not make specific recommendations on the structure of limits to diversification or organizational complexity. Section 123 calls for follow-up studies every five years. This study recommends that the periodic study due in 2016 consider the experience of implementing the Dodd-Frank Act and any further original research, and consider making more specific recommendations.

SECTION C: COSTS AND BENEFITS OF REQUIREMENTS FOR OPERATIONAL SEPARATION BETWEEN BUSINESS UNITS OF LARGE FINANCIAL INSTITUTIONS IN ORDER TO EXPEDITE RESOLUTION IN CASE OF FAILURE

The Report and Recommendation of the Cross-border Bank Resolution Group (Basel Committee on Bank Supervision 2010) finds that interdependency among the various legal entities belonging to a financial institution is a major impediment to resolving such financial institutions in the event of failure. The main problem occurs when legally separate entities cannot operate independently. In contrast to a mere legal separation of entities, which allows different legal entities to be integrated by sharing assets and fixed costs across lines of business, a separation of business units aims to establish units that can operate independently from each other. Under a separation of business units, each unit may still comprise numerous legal entities, but these entities are interdependent only within the business unit, not across business units. The focus of this section is the possible costs and benefits of requiring separation of business units within large financial institutions.

The main benefit of requiring separation of business units is that ex-ante, separated units could potentially be sold more quickly in the event that resolution is necessary, which may mitigate the reduction in the supply of credit that often occurs in the event of bank failures. An efficient resolution process also increases confidence in the stability of the financial system.

On the other hand, requiring separation of business units could also create costs. First, market pressures lead to organizational structures that mitigate conflicts of interest in financial markets. Imposing restrictions on organizational structure may exacerbate these conflicts of interest and therefore reduce the supply of credit (*allocative efficiency*). Second, financial institutions with separated business units may lose economies of scale (*technological efficiency*), increasing the *cost of credit*. Third, limited liability of separate business units may lead to *excessive risk taking* in each unit.

REVIEW OF THE LITERATURE

MARKET DEMAND FOR SEPARATION OF BUSINESS UNITS

Why do markets sometimes require the separation of business units? Kroszner and Rajan (1997) argue that market forces can lead financial institutions to adopt an efficient organizational structure. In particular, the authors examine the two ways of organizing investment banking operations in the U.S. before the 1933 Glass-Steagall Act: as an internal securities department within the bank and as a separately incorporated affiliate with its own board of directors. The

authors find that internal departments obtained lower market prices for their issues, even though these issues appeared to be of higher quality. This reflects a risk premium associated with greater conflicts of interest when lending and underwriting occur within the same structure. As a result, many commercial banks chose the separate affiliate structure. In this case, organizational structure was an effective commitment mechanism for some entities, and market pressures propelled some banks to adopt an internal structure that was designed to address concerns about internal conflicts of interest. In general, one can argue that the organizational structure of financial institutions is chosen to maximize firm value while achieving compliance with legal, regulatory, and tax requirements in all host countries. Therefore, the optimal organizational form is expected to enhance the efficiency of capital markets.

Houston and James (1998), studying internal capital markets of banks, provide a second example of how an optimally chosen organizational structure can improve the allocation of capital. They show that loan growth of banks affiliated with a multi-bank holding company is typically less sensitive to the bank's cash flow, liquidity, and capital position than loan growth among unaffiliated banks. All banks find external capital to be more expensive than internal capital. Easy access to an internal capital market enhances the efficiency of affiliated banks even though they operate as separate entities.

Regulation that requires the separation of business units beyond market requirements is likely to increase costs to individual financial institutions. Hence, the cost of credit may increase, if these costs are not outweighed by other benefits that derive from separation. If the separation also affects intra-group allocation of resources, then additional separation may lead to a less efficient allocation of credit.

BENEFITS OF SEPARATION

The legal and operational separation of business units may be beneficial for financial institutions as it allows for diversification. In particular, separation implies that financial institutions can benefit from non-core income, while the associated core financial activity is protected from losses on non-core activities. Templeton and Severiens (1992) argue that diversified financial institutions are less exposed to income shocks and are therefore more stable. A second benefit of legal and operational separation is that it may facilitate the fast and efficient sale of profitable units in case of liquidation. Legal and operational separation also simplifies the establishment of bridge banks and bad banks.² McDill (2004) finds that large banks usually suffer lower loss rates in the event of resolution, in part because not all business units are affected.

Perhaps the best evidence for the benefits of separation of business units in case of resolution is the case of Bank of Credit and Commerce International (BCCI). Baxter and Somner (2005) show

² For a summary of the options for resolution in more detail, see Santomero and Hoffman (1999).

that United States authorities were able to separate and reorganize First American, a bank holding company owned by BCCI, precisely because it had few interaffiliated operational, credit, or reputational relationships with BCCI. Supervisors succeeded in the reorganization because they reestablished trust in the bank holding company and its affiliated banks.³

Fast and efficient resolution of troubled financial institutions also increases the confidence of financial market participants in the overall soundness of the financial system. First, fast and efficient resolution reduces the likelihood of runs on troubled institutions or on institutions that are exposed to them. Second, Ashcraft (2005) shows that the FDIC-induced failures of healthy local subsidiaries of failed multi-bank holding companies have real effects on local economies through a severe reduction in bank lending. The effects of these loan supply shocks can be dampened if subsidiaries consist of separate business units that can be sold fast and continue to operate.

COSTS OF SEPARATION

Large financial institutions are usually complex. For instance, Lehman Brothers Group consisted of 2,985 separate legal entities in about 50 countries. In this case, legal separation did not map into a clear separation of business units that were able to operate independently. On the contrary, the Group's main functions, such as liquidity management, were centralized (Basel Committee on Bank Supervision 2010). Centralizing certain functions to take advantage of economies of scale is common in large financial institutions. A requirement to separate business units may result in duplication of previously shared assets and fixed costs and may reduce economies of scale.

In some cases, the organizational and legal separation of business units can lead to excessive risk taking. Broome (1993) notes that prior to 1989, bank holding companies had an incentive to increase risk in individual member banks. Since a bank holding company was liable only up to its equity investment in the subsidiary bank, bankruptcy risk was shifted to the FDIC. Following the FDIC Improvement Act (FDICIA) of 1989, the affiliated banks within a bank holding company system were subject to cross-guarantee liability for the FDIC's losses incurred due to the failure of an affiliated bank. Even prior to the FDICIA, however, Cornyn, Hanweck, Rhoades, and Rose (1986), argued that bank holding companies are generally inclined to support ailing affiliates out of reputational and credibility concerns, even when they are legally liable only up to their equity investment. Such concerns could dampen the incentives to take on excessive risk in separated business units.

Baxter and Somner (2005) argue that most complex organizational structures with a large number of interdependent legal entities are established to achieve tax efficiency, but not

³ For a detailed discussion of the resolution process of BCCI, see Herring (2005).

necessarily economic efficiency, once the cost of supervision in the event of resolution is taken into account. From a supervisory point of view, a clear mapping from legal entities to business units may be desirable, since separate business units may be sold faster in the event of resolution. The authors advocate regulation that encourages a reduction in interdependencies in order to facilitate a fast, orderly resolution. Such regulation, however, may reduce the number of subsidiaries, which may result in lower bank profits due to higher tax liabilities. This could increase the cost of credit.

SUMMARY

The separation of business units may expedite the resolution of a financial institution. A fast and efficient resolution regime can dampen loan supply shocks due to a failure of a financial institution. Efficient resolutions also enhance trust in the soundness of the financial system, which is crucial to the efficiency of capital markets. Market forces lead financial institutions to choose their organizational structure that maximizes efficiency. This sometimes leads to a separation of business units in order to reduce conflicts of interest. However, the separation of business units can reduce the firm's ability to centralize functions such as liquidity management, and can thus result in a reduction in economies of scale. Restrictions on the organizational structure of financial institutions might also distort the allocation of capital in the economy, increase tax liability, increase risk taking, and reduce overall capital market efficiency. Rajan and Zingales (1998) study the relationship between finance and growth and find that external finance-dependent industries grow slower in countries with less efficient capital markets.

The literature on the separation of business units is sparse. Future research could aim to (1) quantify the increase in the cost of credit due to a reduction in economies of scale caused by the separation of business units, (2) provide comparative case studies of bank resolutions to help determine the optimal separation of business units, (3) estimate the effect of separated business units on risk taking behavior relative to an integrated corporate structure, and (4) examine the implications of tax liability for allocative efficiency and the cost of credit.

This study will not make specific recommendations on the structure of requirements for operational separation between business units of large financial institutions. Section 123 calls for follow-up studies every five years. This study recommends that the periodic study due in 2016 consider the experience of implementing the Dodd-Frank Act and any further original research, and consider making more specific recommendations.

SECTION D: COSTS AND BENEFITS OF LIMITS ON RISK TRANSFER BETWEEN BUSINESS UNITS OF LARGE FINANCIAL INSTITUTIONS

The transfer of risky assets among subunits of the same firm may either occur among business units that are financially commingled—meaning, in accounting terms, that their balance sheets are “consolidated”—or they may occur between a firm and an off-balance sheet entity, such as a “qualifying” special-purpose vehicle (SPV), or between a bank and an affiliated firm that engages in non-banking activities. Risk transfer among consolidated business units is an integral part of the internal capital allocation decisions of firms. An allocation mechanism that transfers operating capital from one business unit to another effectively increases the risk of the transferor and decreases the risk of the transferee. In the case of asset transfers from a firm to an off-balance sheet entity or an affiliate, the concern is that the transferor retains some portion of the risk without openly disclosing this exposure or accounting for the risk in its financial statements. This tacit transfer of risk back to the balance sheet of a transferor is known as implicit recourse.

Financial Accounting Standard No. 140 (FAS 140), issued in September 2000, allowed off-balance sheet treatment only for “true sales” in which the asset is sold to a “qualifying SPV” and in which the transferor surrendered control rights over the receivables. In principle, FAS 140 did not allow sponsoring firms to subsidize or otherwise provide recourse to off-balance sheet SPVs in bad states of the world, since the courts would interpret such recourse as evidence that there was no true sale of assets to the SPV to begin with. In practice, there is evidence (discussed below) that firms provided *ex-post* assistance to sponsored SPVs on many occasions, even though they could not commit to such assistance *ex-ante*. Financial Accounting Statements 166 and 167 (FASB 166/167), which took effect at the beginning of 2010, reduce the ability of firms to engage in implicit recourse by abolishing qualifying SPVs and requiring firms to disclose more information about continuing involvements with transferred financial assets. However, because the different means by which implicit recourse can be provided are broad, and because there is not always a straightforward test of whether a given act is a form of recourse, it would be difficult to close the regulatory loopholes that enable implicit recourse entirely even if doing so were desirable.

This section discusses both the literature studying implicit recourse and the literature studying risk transfer among consolidated business units. Before proceeding, it is important to clarify that this section does not concern the costs and benefits of securitization *per se*. Securitization, like other forms of asset sales (such as loan sales), creates potential adverse selection and moral hazard problems due to asymmetric information; for instance, investors may be concerned that firms will be more likely to sell or securitize loans about which they have adverse private information.

As discussed below, concerns about asymmetric information were one reason that firms provided implicit recourse to SPV investors, and some existing research on implicit recourse uses data from credit card securitizations. However, securitizations did not necessarily create a presumption of implicit recourse among investors; for instance, recourse for investors in asset-backed commercial paper and mortgage backed securities was available only in explicit pre-specified circumstances. Conversely firms provided implicit recourse in many cases that did not involve securitization, such as recourse to sponsored hedge funds.

REVIEW OF THE LITERATURE

IMPLICIT RECOURSE

Implicit recourse manifests itself in many different forms. Examples include the transferor selling assets to an SPV at a discount; buying assets from the SPV at a premium; exchanging performing assets for nonperforming assets; and providing new credit enhancements such as additional “overcollateralization” of the trust beyond what was agreed to under the original terms of the deal. The frequent occurrence of implicit recourse in securitization deals that involve revolving asset pools is especially well-documented. For example, Higgins and Mason (2004) study 17 actual recourse events related to credit card securitizations. They find that following each recourse event, the market reacted favorably and rewarded providers of recourse with higher short- and long-term stock price performance and better long-term financial performance.⁴ Further studies are required to understand the reactions to recourse events that occurred during the recent financial turmoil. However, even if individual firms benefit from providing implicit recourse, the existing literature has less to say about the overall effect of implicit recourse on the health of financial markets.

The existence of implicit recourse is typically regarded as either an efficient response to market failures caused by asymmetric information or a form of regulatory capital arbitrage. Gorton and Souleles (2005) take the former view. They develop a model in which the ability to sell assets into an off-balance sheet SPV benefits the transferor by allowing it to economize on bankruptcy costs: bankruptcy procedures entail the long and cumbersome transfer of control rights over assets to creditors, and because SPVs are bankruptcy-remote, off-balance sheet financing reduces the quantity of assets that are subject to such transactions. However, the transferor is subject to an adverse-selection problem: investors may refuse to finance the SPV if the firm has private information about asset quality before it decides which assets to sell into the SPV. Investors would rationally assume that the transferor has an incentive to offload assets that are poor in ways not observed by the market, reducing their willingness to pay for the deal. If the transferor

⁴ However, the authors find that sponsoring firms face long delays before being able to issue new securitizations.

and the investors only interact one time, the former cannot commit to not engage in strategic adverse selection. However, if firms interact repeatedly, implicit recourse facilitates securitization because the transferor can gain a reputation for supporting the pools of assets that become distressed. This effectively provides the transferor a strong incentive to not engage in adverse selection. The model implies that implicit recourse may lower the costs of obtaining financing by addressing concerns of asymmetric information; accordingly, limits that prevent implicit recourse may raise the cost of financing and final cost of credit. The model makes no predictions about the effect of requiring explicit recourse or risk retention, as required in Section 941 of the Dodd-Frank Act.

Calomiris and Mason (2004) focus on implicit recourse as a form of regulatory arbitrage: implicit recourse allows sponsoring firms that are subject to capital requirements to reduce regulatory capital while retaining exposure to risky assets. This form of arbitrage may have either beneficial or detrimental effects. On the one hand, the ability to take on hidden risks opens the possibility of firms abusing the government's safety net (e.g., deposit insurance and access to the Federal Reserve discount window). On the other hand, the authors argue that regulatory arbitrage may be socially beneficial if regulatory capital requirements are inefficiently high. In this case, implicit recourse merely restores capital to its most efficient use.

Implicit recourse provided by financial institutions to outside investors raises many of the same issues as subsidized funding provided by banks and other insured depository institutions to affiliated entities that engage in non-banking activities. Forms of the subsidy may include overpaying for securities issued by the affiliated firms or extending loans on terms more favorable than what would be extended to unaffiliated firms, with the result that risk is transferred from the affiliated firm to the depository institution.

Certain regulatory "firewalls" currently in place limit such transfers of risk between insured depositories and affiliated firms. Most notably, Sections 23A and 23B of the Federal Reserve Act limit the total volume of "covered transactions" between a member bank and affiliates and prohibit the extension of terms more favorable than what in good faith would be extended to unaffiliated firms. Sections 23A and 23B limit, but do not entirely eliminate risk transfer. However, the extent to which depositories actually exploit loopholes in the firewall and engage in risk transfer to affiliates is a little-studied question (for example, see Whalen, 1997, who documents the limited literature.) More generally, the extent to which implicit recourse enhances allocative efficiency or leads to abuse of the safety net is an empirical question and deserves closer study.

RISK TRANSFER AMONG CONSOLIDATED SUBUNITS OF A FIRM

Many firms engage in "enterprise-wide risk management," which is the practice of evaluating risk exposures at the level of the entire firm, taking into account the marginal contribution of

each subunit's activities to overall risk. The allocation of financing across subunits through internal capital markets allows firms to manage overall risk exposures while preserving decentralized decision making. For example, a subunit that increased exposure to a particular risk would have to purchase additional capital from the rest of the firm, forcing the subunit to pay a "market" price for taking on that additional risk. Through the transaction, some of that risk is effectively transferred to the rest of the firm.

A number of studies in management science analyze the implementation of enterprise-wide risk management. Nocco (2006) discusses enterprise risk management for firms in general, while Cumming and Hirtle (2001) and Saito (1999) specifically discuss enterprise risk management for financial firms. Most of these studies imply that restrictions on risk transfer are likely to be costly for firms and thus could increase the cost of credit and other financial services. For one thing, restrictions may force firms to adopt a more "balkanized" risk management approach that does not take into account interactions among the activities of different subunits. Moreover, business units may be forced to seek external counterparties for transactions that would be more efficiently carried out internally. For example, complementary activities at different subunits often serve as "natural hedges" for each other, reducing reliance on external hedges (Cumming and Hirtle 2001). Contracting with external parties tends to be costlier due to transaction costs across firm boundaries. Restrictions on risk transfer may also limit an additional benefit of enterprise-wide risk management, which is that it gives firms an incentive to put effort into identifying the shadow cost of each business unit's activities to the overall riskiness of the firm. To the extent that restrictions on risk transfer reduce such effort, hidden risks may remain unexposed.

Not all of the evidence favors the use of internal market mechanisms for risk transfer, however. For one thing, there are many different types of risk (credit, liquidity, operational, reputational, etc.), and it is not clear that any capital allocation mechanism is capable of managing all of these risks (Cumming and Hirtle 2001). Moreover, intra-firm risk transfer programs can sometimes generate perverse managerial incentives. For example, Tufano (1998) gives an example of how business unit managers may have an incentive to engage in "cash flow hedging" —measures to ensure that the business unit always has excess cash, in order to reduce reliance upon the internal capital market. This practice may shield inefficient projects from scrutiny and allow managers to act against the best interest of shareholders.

SUMMARY

Restrictions on risk transfer can, in theory, have both positive and negative effects. The overall effect is likely to depend upon their specific implementation. Implicit recourse is a way for sponsors of SPVs to commit to not engaging in adverse selection through long-run reputational effects. Limits on implicit recourse would remove a form of contracting that is efficiency enhancing from the perspective of individual firms, and would likely prevent certain types of

asset sales from occurring. The cost of obtaining funds would rise for some sponsoring firms, such as originators of riskier assets for which private information plays a larger role. Whether or not preventing such deals from occurring is beneficial for the economy as a whole deserves further study.

Implicit recourse may allow firms to circumvent capital regulations and take on more risk than they are charged for through capital requirements. Restrictions on such risk transfers may limit banks' ability to exploit the government safety net. However, an argument against limiting regulatory arbitrage is that doing so would, at least in theory, prevent firms from avoiding capital requirements that could be inefficiently high.

Limits on risk transfer among consolidated business units would reduce the ability of firms to use enterprise-wide risk management. Firms would most likely be forced to adopt a more balkanized, and potentially costlier, approach to internal capital allocation. Restrictions on risk transfer may also reduce the efficient use of "natural" hedges generated by activities at different business units, forcing individual business units to seek outside sources of hedging at a higher overall cost. Firms may also have a reduced incentive to identify the true shadow cost of each business unit's activities to overall riskiness of the firm.

The above arguments must be tempered by the consideration that, in practice, internal capital allocation mechanisms may not adequately account for all the different types of risk that a firm may face. If not, then the firm's internal market for capital may not be an effective way to manage risk. Moreover, perverse managerial incentives may lead to cash flow hoarding that shields inefficient projects from scrutiny. Each of these factors would tend to reduce the costliness of limiting risk transfers.

Section 941 of the Dodd-Frank Act addresses adverse selection by requiring securitizers to retain a share of the credit risk of transferred assets. However, Section 941 leaves great discretion to regulators to implement this requirement. Regulators will determine the amount of risk securitizers will retain, the form(s) in which they may retain it, and other critical elements. The regulators are still in the process of formulating a proposed regulation for comment. The Chair of the FSOC is coordinating the rulemaking process, as required by Section 941. The study required by section 946, which is being released simultaneously with this study, considers these issues and contains recommendations.

SECTION E: COSTS AND BENEFITS OF REQUIREMENTS TO CARRY CONTINGENT CAPITAL OR SIMILAR MECHANISMS

Contingent capital or similar mechanisms are arrangements that are intended to bolster the solvency of a financial institution following a trigger event (typically a measure of distress). Such arrangements can include debt-to-equity swaps or a permanent write-down of debt. These instruments have been discussed as a potentially lower-cost form of loss-absorbing capital that could be helpful in addressing some of the challenges faced in the most recent financial crisis. For example, in the recent crisis: (i) traditional hybrid securities did not always absorb loss in the manner anticipated *ex-ante*; (ii) many market participants discounted the value of such traditional hybrid capital instruments, by focusing on measures such as tangible common equity; and (iii) the level of total capital was insufficient to absorb the losses incurred by the firms.

Accordingly, policy makers have sought to improve both the quality (loss absorbency), as well as the level of capital. Contingent capital seeks to facilitate both, by ensuring that investors in contingent capital instruments can be made to take losses by converting to capital when a financial institution reaches or approaches insolvency, and by reducing the overall cost of maintaining such higher levels of capital. Although widespread agreement on the structural design of contingent capital arrangements remains unresolved, some research suggests that contingent capital requirements implemented when the chances of a downturn or a financial panic seem remote could make them relatively cheap compared to raising new capital in the midst of a recession or after a financial panic in a period of great uncertainty (see Kashyap, Rajan and Stein (2008), Rajan (2009), and Squam Lake Working Group (2009)).

Moreover, contingent capital arrangements may increase market discipline and help to contain some governance problems at financial institutions, such as banks.⁵ Once in place, contingent capital mechanisms may provide incentives for managers to raise capital when they anticipate losses are on the horizon. For example, institutions that remain well-capitalized through earnings retention could avoid the dilutive effect of forced debt-to-equity conversion under some arrangements. In this sense, contingent capital can buttress market discipline, reduce the likelihood of failure, and deter excessive risk-taking. Therefore, such arrangements may be a more efficient way to reduce the probability of financial institution failures than requiring higher capital levels in good times and bad.

For such reasons, some policymakers have expressed an interest in potentially employing contingent capital or similar mechanisms to reduce systemic risks, to implement countercyclical

⁵ Kashyap, Rajan, and Stein (2008) discuss how agency problems play an important role in shaping bank capital structures. They argue that banks mainly fund their balance sheets with short-term debt because such creditors are better protected from the actions of wayward bank management. These authors also argue that the reduced cost of additional capital can dampen a bank's incentive to engage in regulatory arbitrage.

capital buffers, or to reduce the exposure of taxpayers to losses. To achieve such ends, various triggers have been proposed, either referencing the financial condition of the individual institution, or more broadly, the condition of the financial system (often referred to as ‘macro’ triggers). Firm specific triggers may include, but are not limited to: (i) regulatory capital based triggers; (ii) regulatory discretion, whereby the instrument would convert at the direction of the firm’s regulator; (iii) a market based trigger, referencing liquid and broadly quoted instruments, such as a firm’s stock price or credit default swap (CDS) pricing; and (iv) when the firm reaches a point of non-viability.⁶

As noted herein, there have been limited issuances of contingent capital instruments to date. Some have expressed concerns about the feasibility of contingent capital, including the ability to market these instruments in sufficient sizes, the pricing such instruments would achieve, the ability for such instruments to generate capital when needed, and the efficacy of such capital generation in mitigating runs. Accordingly, the arguments in support of contingent capital requirements are largely theoretical, and will not be resolved absent further analysis by policy makers, and ultimately, the future sale of such securities, if deemed prudent.

To date, contingent capital and similar mechanisms remain in the nascent stage of development. The academic literature on such mechanisms is growing rapidly with interest in the topic from policymakers, but it remains scant. Section 115(c) of the Dodd-Frank Act requires the Financial Stability Oversight Council to release a study within two years of enactment on the feasibility, benefits, costs, and structure of a contingent capital requirement for designated nonbanks and large bank holding companies. Pursuant to the release of this study, the Council may make recommendations to the Board of Governors to require these firms to maintain a minimum amount of contingent capital.

On the international front, the Basel Committee on Banking Supervision is currently assessing whether such arrangements are appropriate for meeting a portion of required maintained capital buffers held by banking organizations and/or for assisting in the resolution of institutions that are under stress. Moreover, in October 2010, the Financial Stability Board recommended that greater loss absorbency capacity could be drawn from a menu of viable alternatives including “a quantitative requirement for contingent capital instruments and a share of debt instruments or other liabilities represented by “bail-inable” claims, which are capable of bearing loss at the

⁶ The Basel Committee on Banking Supervision released a *Proposal to ensure the loss absorbency of regulatory capital at the point of non-viability* for comment in August 2010 that defined non-viability as: “(1) the decision to make a public sector injection of capital, or equivalent support, without which the firm would have become non-viable, as determined by the relevant authority; and (2) a decision that a write-off, without which the firm would become non-viable, is necessary, as determined by the relevant authority.”

point of non-viability, i.e. within resolution, thus enabling creditor recapitalization and recovery while maintaining vital business functions.”⁷

REVIEW OF THE LITERATURE

The existing literature is not advanced enough to justify quantitative statements on the impact of contingent capital on growth. Moreover, the few financial institutions that have made such arrangements have not provided sufficient data to assess how various potential features (e.g. different trigger types) would affect costs.

Lacking empirical evidence, the literature has generally focused on theoretical analyses of alternative types of contracts designed to provide capital when it is needed, in a manner that solves the debt overhang problem.⁸ Flannery (2009), for example, proposes “contingent capital certificates,” a form of debt that would convert to equity when a firm’s contemporaneous market value falls below a pre-specified threshold value (e.g., 4 percent of total assets). He envisions that the face value of converted debt would purchase a quantity of shares implied by the market price of common equity on the date of conversion. He argues that contingent capital certificates would (1) recapitalize a firm promptly after it has suffered losses, (2) lower the firm’s probability of default and loss following the debt-to-equity swap, and (3) lower the all-in cost of loss absorption capacity, since such instruments are likely to receive a favorable tax treatment. Moreover, he argues that conversions would tend to mitigate the pro-cyclical effects of capital standards, since new equity would be provided when loan losses are exceptionally high.

Building on Flannery’s proposal, Pennacchi, Vermaelen and Wolff (2010) have proposed that financial institutions issue Call Option Enhanced Reverse Convertible (COERC) bonds, a form of subordinated debt that converts to equity when the market value of equity falls below a pre-specified trigger. In their proposal, the conversion price would be set significantly below the trigger price, and shareholders would be provided the option to buy back the shares from the bond holders at the conversion price. These authors reason that the first feature would severely dilute existing shareholders upon conversion, giving the shareholders a strong incentive to exercise the call option and buy back the shares from the bondholders at the low conversion price. As a result, the combined effect of reaching the trigger is that the bondholders are paid in full, while the shareholders inject new equity into the financial institution in the amount of the convertible bond. If existing shareholders do not desire to hold more shares in the firm, then they can simply sell their call options to others. Pennacchi, Vermaelen and Wolff argue that COERC bonds would force capital into the firm at a time of financial distress while retaining

⁷ See Financial Stability Board, 2010, “Reducing the Moral Hazard Posed by Systemically Important Financial Institutions: FSB Recommendations and Time Lines,” October.

⁸ The firm faces a debt overhang problem when the face value of the existing debt is bigger than the expected payoff to debt holders. In such circumstances, debt holders will not finance the firm.

some of the desirable features of debt (e.g. the discipline on managers), and would reduce the cost of contingent capital, because bondholders would typically be repaid at full. Also, because bondholders would never get more than par, COERC bonds would have a lower risk of “death spirals,” in which the share price drops sharply once it gets sufficiently close to the conversion trigger merely because of the prospect of imminent dilution of existing shareholders.

Other researchers have considered whether more than one trigger event should be included in a contingent capital contractual arrangement. For example, the Squam Lake Working Group on Financial Regulation (2009) proposes a contingent capital instrument that would convert from debt to equity only when two conditions are jointly met, namely (1) a declaration has been made by regulators that the financial system is suffering from a systemic crisis, and (2) the financial institution has violated the covenants in the hybrid-security contract (e.g. a covenant based on capital adequacy, such as a minimum ratio of Tier 1 capital to risk-adjusted assets). The Working Group argues that the double trigger is important for three reasons: (1) debt is valuable, since debt holders can put a firm into bankruptcy; (2) the institution-specific trigger assures that sound firms will not convert debt to equity unnecessarily; and (3) conversion is limited to periods of systemic crisis, so that the hybrid security functions like debt except in the most extreme circumstances. That is, the hybrid security would not morph into equity merely because the firm suffers idiosyncratic losses, so market discipline would be preserved even while the financial system would be better protected against systemic risk.

Similarly, McDonald (2010) has proposed a contingent capital instrument that would convert from debt to equity only when two conditions are met, namely (1) the financial institution’s stock price is at or below a trigger, and (2) the value of a financial institutions index is also at or below a trigger value. In addition, McDonald’s proposal stipulates that the underlying debt would convert into a fixed number of shares at a premium price. He argues that his instrument would (1) protect financial institutions by reducing their debt load during a crisis when all firms are performing poorly, while permitting a financial institution that is in poor condition in normal times to go bankrupt; (2) avoid the problem that regulators may not declare the existence of a crisis until it is too late to restructure firms; and (3) avoid potential “death spiral” problems, because the number of shares that debt holders would receive in a conversion is fixed.

Two recent examples of actual contingent capital contracts are Lloyds Banking Group and Rabobank Group. On November 3, 2009, Lloyds Banking Group offered to swap 16.5 billion pounds of bonds and preference shares for equity and new dated notes—known as contingent core Tier 1 securities—that will automatically become equity if the bank’s core capital falls to less than 5 percent. This offering was designed to bolster the institution’s capital so that it would not have to take part in the UK government’s Asset Protection Scheme. These new bonds counted toward core capital because they could convert to equity. On March 12, 2010, meanwhile, Rabobank Group issued 1.25 billion Euro of a 10-year, fixed-rate, Senior Contingent Note. This note will be written down to 25 percent of its face value if Rabobank's equity ratio declines below 7 percent. The Senior Contingent Note was considerably oversubscribed when it

was launched. However, the issuer's unusually strong credit profile raises questions about whether this transaction is indicative of broader investor demand.

Although the foregoing examples are focused on restructuring a solvent financial institution, other proposals have focused on the process for resolving a failing financial institution. For example, Calello and Ervin (2010) argue that regulators should be given legal authority to dictate the terms of a recapitalization, subject to an agreed-upon framework. The details would vary from case to case, but the process would work as follows: First, the assets would be written down. Second, if existing shareholders are wiped out, then preferred-stock and subordinated-debt investors would have their stakes converted to equity at pre-specified terms. Third, if the firm remains undercapitalized, then senior unsecured debt holders would have a portion of their stake converted to equity. Under the Calello and Ervin proposal, the financial institution's previous shareholders would receive warrants if the firm's losses have wiped them out. These warrants would only have value if the new financial institution rebounded. Existing management would be replaced after a brief transition period. This is an example of a "bail-in" contractual arrangement, and is similar to contingent capital mechanisms.

Still other proposals have focused on using contractual arrangements to stabilize the financial system during a severe downturn or systemic event. For example, Kashyap, Rajan and Stein (2008) propose using an insurance contract to recapitalize financial institutions upon the occurrence of a systemic event—defined as a situation in which aggregate write-offs of major financial institutions in a given period exceed a pre-specified trigger level. This insurance contract would be default-proof, since the insurer (e.g. a sovereign wealth fund or a pension fund) would at inception put cash and Treasury securities into a "lock-box." If there is no systemic event over the life of the contract, the cash and securities would be returned to the insurer, who would also receive an insurance premium from the financial institution as well as the interest on the Treasury securities. However, if there is a systemic event, the cash and securities would be transferred to the balance sheet of the insured entity, thereby increasing its capital and liquidity.

These brief descriptions of various contingent capital proposals, actual contracts in place, and related mechanisms, demonstrate the diversity of contractual arrangements that could potentially be used by financial regulators. At this time, there is no consensus on the optimal contractual arrangement that would promote financial stability, increase market discipline, and foster prudent risk-taking by financial institutions. Clearly, more work is needed to identify arrangements that would most effectively stabilize credit provided by financial intermediaries and most closely align private and social costs of financial institution risk exposures. Moreover, the investor appetite for such ideal contractual arrangements is unclear.

SUMMARY

The benefits and costs of contingent capital and similar mechanisms for financial firms and the wider economy will critically depend on the specific features of the contracts—what kind of structure is employed (e.g. debt-to-equity swap or insurance contract), what type of trigger is used (e.g. firm-specific or systemic), and what threshold is set for actions such as a recapitalization through a cash injection or a debt write-down. Such features will affect how frequently recapitalization or other actions take place and whether the mechanism achieves the desired results (e.g. greater market discipline, more stable credit, greater loss absorption capacity through larger capital buffers, and less systemic risk). Equally important for cost-benefit analysis are the tax, legal, and regulatory frameworks in place over the life of the contract.

On the benefit side, much of the academic literature has focused on the potential for contingent capital to (1) reduce systemic risk; (2) augment market discipline on systemically-important financial institutions; (3) reduce incentives to shift activities to unregulated firms during boom times; (4) align private costs with the social costs associated with systemic risks through privately-provided “tail-risk” insurance; and (5) provide incentives for systemically-important firms to raise capital when they anticipate losses.

It is unclear to what extent these benefits could be realized in practice. With regard to potential costs, much of the academic literature has focused on whether specific contingent capital contracts would result in unfavorable market dynamics, such as “death spirals” or a “run” on financial firms with similar exposures. Another concern addressed by the literature is that debt-to-equity conversions or other actions to recapitalize a firm could be taken too early or too late. For example, a financial institution may remain subject to a “run” by short-term liability holders even if it has buffer of contingent capital in place, because such investors may perceive that capitalization will remain thin enough after the triggering event to encourage the management to “bet-the-bank” by taking on excessive risk. Importantly, some recent research has used back-testing to explore the performance of various contingent capital mechanisms.⁹

This study will not make specific recommendations on the structure of requirements to carry contingent capital or similar mechanisms. Section 123 calls for follow-up studies every five years. This study recommends that the periodic study due in 2016 consider the experience of

⁹ DeMartino, Libertucci, Marangoni, and Quagliariello (2010) have back-tested contingent capital structures like the one proposed by the Squam Lake Working Group using data on the largest 15 banks in terms of total assets across eight countries (Canada, France, Germany, Italy, Spain, Japan, the UK, and the US) over 1994-2009. They consider several financial institution-specific triggers, based on the total capital ratio, the Tier 1 capital ratio, leverage, return on equity, and abnormal returns over several different horizons. For the financial index, they consider returns of domestic banking indices over different horizons and a deviation of GDP over trend. The authors report that their simulations indicate that common thresholds across jurisdictions with definitions of supervisory capital do not work well, but market-based triggers work better at identifying banks that are troubled.

implementing the Dodd-Frank Act and any further original research, and consider making more specific recommendations. The study required by section 115(c) will also consider these issues.

SECTION F: COSTS AND BENEFITS OF LIMITS ON COMMINGLING OF COMMERCIAL AND FINANCIAL ACTIVITIES BY LARGE FINANCIAL INSTITUTIONS

This section reviews the existing literature on the commingling of commercial and financial activities by large financial institutions. This literature typically focuses on what is often called “the mixing of banking and commerce,” which involves the entry of commercial firms into the market for banking products or services or, conversely, the entry of banking firms into the market for commercial products or services. Although many of the issues are transferable, the discussion does not address the related issue of whether banking organizations should be allowed to take long-term positions in the equity of commercial firms to which they lend.¹⁰

Historically, the United States has legally separated the business of banking from that of general commercial activities. The Bank Holding Company Act includes general restrictions on the mixing of banking and commerce and federal law has long prevented commercial banks from affiliating with commercial companies. A recent Treasury report argued that existing restrictions on the mixing of banking and commerce have prevented conflicts of interest, risks to the federal safety net, regulatory and supervisory difficulties, potential biases in the allocation of credit and concentration of economic power. The report concluded that “the wall between banking and commerce should be retained and strengthened.”¹¹ Other countries, notably Japan, have made different choices and have allowed the mixing of commerce and banking.

Clearly, there are benefits and costs to limiting the mixing of banking and commerce. In relation to lending, these limits could affect the supply and cost of credit. For example, limits on the mixing of banking and commerce may help prevent conflicts of interest such as preferential funding of the commercial affiliate or real and perceived tying of products, as addressed in the anti-tying restrictions of section 106 of the Bank Holding Company Act. This would improve the allocative efficiency of credit by preventing the misallocation of credit for the purpose of commercial gain. However, it is possible that limits would prevent the entry into banking of commercial firms that could improve competition for credit, increase innovation and promote economies of scope.

Limits could also affect the amount of risk in the financial system. Separation of banking and commerce can protect the safety and soundness of a bank by preventing the risks of an organization’s commercial activities from directly or indirectly affecting the financial health of an affiliated bank. Similarly, separation would prevent a bank from inappropriately supporting a

¹⁰ Although officers of banking organizations in the U.S. may sit on the board of directors of firms to which they lend, the ability of U.S. banking organizations to own significant, long-term equity interests in commercial firms is limited by U.S. law. Banks are allowed to hold corporate equity in other countries, such as Germany and Japan.

¹¹ Financial Regulatory Reform: A New Foundation, Department of Treasury, 2009, p. 34,

failing commercial parent or affiliate, which could jeopardize the bank's solvency. These precautions would be in line with Sections 23A and 23B of the Federal Reserve Act, which limit bank transactions with parents and affiliates. Separation would also prevent inadvertent expansion of the federal safety net. Without separation, a bank's commercial parent or affiliates could indirectly benefit from the bank's status as an insured depository institution. However, one of the costs of such limits would be to prevent certain entities from providing equity capital to establish a financial institution or assist in purchasing a troubled institution.

While Gramm-Leach-Bliley expanded the range of financial activities that may be conducted by qualifying banking organizations, it intentionally left in place the separation of banking and commerce (i.e., the separation of financial and nonfinancial activities). According to Krainer (2000), many of the architects of Gramm-Leach-Bliley argued that the United States should maintain its existing separation of banking and commerce.

There are several existing loopholes within current U.S. law concerning the barrier between banking and commerce. One of the most significant involves industrial loan companies (ILC). Current law allows commercial firms to operate an ILC without being subject to the same regulatory oversight and capital requirements as bank holding companies. Currently, only seven states allow for an ILC Charter and the vast majority of assets under ILC control are located in three states. In many respects, ILCs have similar authorities to those of commercial banks, including access to the federal safety net, although there are limits on their ability to accept demand deposits. In 2005, the debate over the integration of banking and commerce resurfaced when several major commercial companies applied to acquire an ILC. The following year, the FDIC announced a moratorium on all ILC applications and encouraged Congress to address the issue through legislation.¹² The Dodd-Frank Act places a temporary legal moratorium on new acquisitions of ILCs by commercial firms, but this moratorium will expire on July 21, 2013.¹³ The Treasury has proposed ending the ILC loophole and requiring holding companies of ILCs to become bank holding companies.¹⁴

REVIEW OF THE LITERATURE

Due to the specific nature of the policy issue, there is not a large economic literature in this area. There is empirical evidence on the experience with universal banking in Europe, but the

¹² At the time, there were 58 ILCs operating in seven states.

¹³ Prior to the Gramm-Leach-Bliley Act, commercial firms also were permitted to acquire a single FDIC-insured savings association and become a "unitary" savings and loan holding company. In the GLB Act, Congress closed the unitary savings and loan holding company loophole in order to prevent the formation of new unitary holding companies.

¹⁴ Financial Regulatory Reform: A New Foundation, Department of Treasury, 2009, p. 35.

European model permits the mixing of different kinds of financial activity, as opposed to the mixing of banking and commerce. Empirical evidence from Japan on the mixing of banks and corporations has shown that misdirected lending played a role in prolonging the Japanese macroeconomic stagnation that began in the early 1990s (Caballero, Hoshi and Kashyap 2008). Focusing on the literature relevant to the U.S., there are several survey articles that lay out the issues on both sides of the debate.¹⁵

Saunders (1994) and Blair (2004) provide an overview of the public policy case for and against relaxing the separation between banking and commerce in the United States. The studies cite as potential costs the concentration and potential monopolization of financial services activities, increased conflicts of interest, and concerns about bank soundness and expansion of the bank safety net to commercial activities. The studies also cite potential benefits, which could include cost and revenue synergies, product and geographic diversification, new sources of capital, and increasing competitive pressure on inefficient management.

Krainer (2000) offers another perspective on the mixing of banking and commerce. He notes that a number of large banks today began as the finance arms of commercial enterprises. The author also addresses potential issues arising from informational advantages. For instance, finance companies can use the parent firm's knowledge of a product or demand to secure a funding advantage over traditional lenders. While this offers potential opportunities for economies of scope, policy makers may also be concerned about potential abuses of this information for anticompetitive purposes due to conflicts of interest.

Reichert, Wall and Lang (2008) analyze the potential diversification benefits of mixing banking and commerce. They argue that financial theory suggests that combining assets in an efficient portfolio allows an investor to obtain a given return at lower risk. The authors calculate the correlation of returns across ten major industry categories and find that diversification benefits could result from combining banking with construction, retail, or wholesale trade. This work does not address potential costs associated with mixing banking and commerce.

Going forward, additional empirical work analyzing the effects of current U.S. policy on the separation of banking and commerce would be helpful in better understanding both the costs and benefits of our current policy. Work that analyzes the effects of this separation in light of the financial crisis of 2008 would be of particular interest, as would work that analyzes the ILC loophole's effect on various commercial companies and markets.

¹⁵ The existing literature primarily addresses effects on financial firms rather than implications for the real economy, so the potential effects on economic growth are not addressed here.

SUMMARY

The literature identifies several clear benefits that arise from the separation of banking and commerce. Separation of banking and commerce may prevent conflicts of interest that would undermine the independence and neutrality of banks in the allocation of credit. Separation may also prevent market power distortions that might arise from the cross-subsidization of commercial and financial products within large conglomerates. If such market power were used inappropriately, it could result in traditional banks being priced out of certain financial services. Separation would also prevent the transfer of risk from commercial firms to banking affiliates or an unintentional expansion of the federal safety net.

The literature also identifies potential costs of limiting the mixing of banking and commerce. These costs could include reduced supply and increased cost of credit. Separation of banking and commerce could reduce technological efficiency by reducing the economies of scope that come from cross-selling and “one-stop shopping.” For example, fixed costs of collecting, processing and assessing information can be spread across a range of commercial and financial services, such as a payments system internal to the commercial entity. Separation of banking and commerce could also prevent a bank from diversifying its earnings with multiple income streams. Empirical studies of both the benefits and costs, however, are limited.

SECTION G: COSTS AND BENEFITS OF SEGREGATION REQUIREMENTS BETWEEN TRADITIONAL FINANCIAL ACTIVITIES AND TRADING OR OTHER HIGH-RISK OPERATIONS IN LARGE FINANCIAL INSTITUTIONS

The traditional separation of banking and other financial activities in the United States began to erode in the 1970s. The last decade saw the emergence of large, complex financial institutions engaged in commercial and investment banking, as well as the emergence of a shadow banking system outside the formal banking sector. The financial crisis has triggered a reconsideration of the costs and benefits of separation between banking and other financial activity. The Dodd-Frank legislation contains restrictions on bank engagement with hedge funds, proprietary trading and derivatives, as well as provisions designed to limit shadow banking, such as expanded resolution authority over nonbank financial institutions.

This section reviews literature on the costs and benefits of separation of banking from other financial activities. Opponents of separation argue that allowing institutions to engage in a broad variety of financial activities promotes competition, diversification, and economies of scope. Supporters of separation argue that combining banking and nonbanking activities in one organization leads to increased risk, at both the institutional and systemic level. According to this view, securities underwriting, dealing, proprietary trading and other “nonbank” activities are inherently risky and lie outside the core competencies of both bankers and their regulators. Moreover, according to this view, since banks have access to deposit insurance and the discount window, combining banking and nonbanking activities in one organization exposes the safety net to the downside risk of nontraditional activities, encourages capital flows into non-traditional activities and may increase systemic risk. This view holds that access to deposit insurance and the discount window provides an effective subsidy to nontraditional banking activity, as public backstops reduce the cost of funds for qualifying institutions.

Supporters of separation also argue that allowing lightly-regulated shadow banks to engage in bank-like activity, particularly maturity transformation, increases systemic risk. Recent and past financial crises suggest that maturity transformation is inherently fragile in the absence of explicit public backstops, as runs can rapidly turn investor concerns about insolvency into a self-fulfilling prophecy. Supporters of separation argue that the best way to prevent such runs is to insist that banking activity be limited to formal banks subject to prudential supervision and explicit public backstops.

REVIEW OF THE LITERATURE

Banks in recent years have increasingly engaged in a variety of nontraditional activities. This section first reviews evidence on the costs and benefits of allowing banks to underwrite securities. It then discusses the costs and benefits of bank trading of derivatives. This is

followed by a discussion of the costs and benefits of allowing banks to engage in other nontraditional activities, including proprietary trading. Finally, this section discusses the costs and benefits of allowing financial institutions outside the formal banking sector to engage in banking activity.

SECURITIES UNDERWRITING

The Glass-Steagall Act prohibited commercial banks and their affiliates from underwriting or dealing in corporate securities. Supporters argued that this prohibition was necessary to prevent lenders with adverse private information from selling securities of weak firms to an unsuspecting public in order to offload credit risk. A contrary argument is that commercial banks would want to establish a reputation for underwriting high quality securities, and that in equilibrium the public could regard lender underwriting as a signal of favorable private information. A number of studies have examined the impact on returns of bank underwriting of corporate debt, both prior to Glass-Steagall and after 1987, when the Federal Reserve first allowed Section 20 affiliates of commercial banks to underwrite corporate securities to a limited degree. Krozner and Rajan (1994), Ang and Richardson (1994) and Puri (1994) find that corporate bonds underwritten during the 1920s by commercial banks or their affiliates had lower ex-post default rates than comparable bonds issued by investment banks, and Puri (1996) finds that issues underwritten by commercial banks or their affiliates during this period had lower ex-ante yields than comparable investment bank issues. Gande, Puri, Saunders and Walter (1997) examine debt issued between 1993 and 1995 and find lower initial yields on issues underwritten by Section 20 affiliates of commercial banks with a prior lending relationship with the firm. Moreover, this effect is only present for below-investment grade issues whose stated purpose is not to repay an existing loan. This evidence suggests that the public perceives a beneficial certification effect of underwriting by lender affiliates, at least for the most information-opaque firms in cases where there is no obvious conflict of interest.

Other studies look at the effect of entry of Section 20 affiliates on underwriting fees charged to issuers. Gande, Puri and Saunders (1999) find that the market share of commercial bank-affiliated underwriters rose substantially between 1987 and 1996, especially for below investment grade issues, and that this rising market share was associated with lower underwriting fees. This result suggests that heightened competition lowered the cost of raising capital for information-intensive firms, although Roten and Mullineaux (2002) find no impact of commercial bank market share on underwriting fees from 1995 to 1998. Drucker and Puri (2005) look at the impact of concurrent lending and underwriting on fees and spreads. They find that investment banks charge lower underwriting fees when they have a concurrent or prior lending relationship with a firm, while commercial banks charge lower rates on new loans when they have a concurrent underwriting relationship with the firm. These results suggest economies of scope from spreading the fixed costs of information acquisition over multiple intermediation outputs.

Another recent literature examines underwriting of asset backed securities (ABS) by commercial bank affiliates and other financial institutions. Securitization of mortgages and other assets holds the promise of expanding credit supply and making the financial system more resilient, by allowing financial institutions to transfer risk from their own balance sheets to outside investors, thereby enabling a given amount of internal capital to support more lending. In the case of residential mortgages, however, securitization was conducted in an unsafe manner that increased risks to individual firms and the financial system.

Nadalund and Sherlund (2009) find that an SEC rule change in 2003 allowing large broker-dealers to securitize more assets led to increased flows of subprime mortgages. This suggests a causal link between securitization and credit creation, although further research should examine whether securitization by commercial banks *per se* also had a causal impact on credit creation.

One drawback of allowing banks to use securitization to transfer risk to outside investors is that banks may have less incentive to screen and monitor loans. There is in fact considerable evidence that securitization encouraged underwriters to relax credit quality standards during the peak of the housing bubble (Nadalund and Sherlund (2009); Keys, Mukherjee, Seru and Vig (2010)) and that servicers of distressed mortgages often act to maximize fees at the expense of investors (Levitin 2010). To the extent that risk transfer encourages banks to devote fewer resources to screening and monitoring loans, the resulting lower quality of intermediation would be a social cost of securitization. Section 941 of the Dodd-Frank Act is meant to reduce this cost by requiring securitizers to retain a portion of the credit risk of the underlying assets.

In some cases, the creators of ABS did retain a considerable amount of risk on their portfolios. Even in such cases, however, securitization may have increased systemic risk, because the regulatory environment allowed creators of ABS to hold less capital than if they had simply held the original assets on their balance sheets. Acharya, Cooley, Richardson and Walter (2009) and Krishnamurthy (2010) find that large financial institutions held considerable amounts of AAA-rated mortgage-backed ABS on their own balance sheets in 2007 and likely suffered large losses as a result. Moreover, banks were required to hold only one-fifth of the capital against these ABS that they would have had to hold against the underlying mortgages. Acharya, Schnabl and Suarez (2010) study asset backed commercial paper (ABCP) conduits. These conduits held long-term, illiquid assets and were financed by short-term debt held by outside investors. As a result, they were subject to considerable liquidity risk; if investors became concerned about underlying asset quality, they would refuse to roll over, and the conduit would struggle to repay investors given the illiquidity of the assets. The authors show that conduits sponsored by commercial banks were typically backed by explicit “full liquidity” guarantees, in which the bank promised to repay investors in full in the event of a run. Even though banks retained the credit risk of the underlying assets, they were required to hold only one-tenth of the capital they would have had to hold against comparable assets on their balance sheets. When ABCP markets froze in August 2007 over subprime mortgage concerns, sponsoring commercial banks paid off ABCP investors in full, often at considerable loss.

The Basel III regulatory framework (Basel Committee on Banking Supervision (2010), also summarized in Hannoun (2010)), recently endorsed by the G20 countries, includes reforms aimed at the concern that securitization was driven in part by a desire to avoid capital requirements. The Basel III risk-based capital requirements raise the risk weight on AAA-rated tranches of securitizations from 7 to 20 percent (compared to a 35 percent risk weight on individual residential mortgages), and apply higher credit conversion factors to short-term liquidity facilities provided to off-balance sheet conduits and structured investment vehicles. In addition, the framework creates a new leverage ratio requirement, setting a minimum standard for a bank's Tier 1 capital as a share of its total (unweighted) assets, where the latter includes balance sheet and off-balance sheet exposures counted on an equal basis.

Finally, while it is likely that securitization increased credit creation in the past decade, this expansion also entailed certain costs, at least in the case of the mortgage market. Mian and Sufi (2009), for example, show that the increase in subprime credit enabled by securitization led to faster house price appreciation during the bubble period, and larger subsequent price declines. Securitization may have enabled lenders to provide mortgage credit at a price lower than its true risk-adjusted social cost, both because of regulatory loopholes and because ratings agencies may have systematically understated the riskiness of AAA mortgage-backed securities. Coval, Jurek and Stafford (2009) and Brennan, Hein and Poon (2009) argue that "ratings arbitrage" was an important motivation for mortgage securitization in this period.

DERIVATIVES

Banks can use interest rate, credit and other derivatives to hedge risks. For instance, traditional banks loan long-term and borrow short-term, and are thus vulnerable to rising short-term rates; this balance sheet risk can be hedged by using interest rate swaps to create off-balance sheet gains when rates rise. However, banks can also use derivatives to take speculative gambles, increasing risk. Banks also frequently trade derivatives in an intermediary role in the over the counter derivatives market. While banks may have a comparative advantage in making markets for certain derivatives, such trading activity exposes banks to counterparty risk.

Interest rate derivatives are the most common type used by commercial banks. Minton, Stulz and Williamson (2009) examine 395 large U.S. bank holding companies, and find that 56 percent used interest rate derivatives in 2005, compared to 15 percent for foreign exchange derivatives, 8 percent for equity derivatives, 6 percent for credit derivatives and 4 percent for commodity derivatives. The literature provides mixed evidence on how closely or successfully banks use derivatives to hedge interest rate risk. Gorton and Rosen (1995) compare the maturity structures of banks' balance sheet and interest rate swap positions, and find that the largest dealer banks use derivatives as a hedge, while large non-dealer banks take derivatives positions that are less well hedged by balance sheet risk. Schrand (1997) finds that savings and loans using derivatives have lower sensitivity of market value to interest rate movements between 1984 and 1988 than

non-derivative users, suggesting that derivatives were used to hedge interest rate risk. Hirtle (1997), however, finds the opposite result in a sample of bank holding companies over the period 1991-1994. Further research would be helpful in reconciling these contradictory results.

Other recent research looks at the impact of interest rate derivatives on banks' provision of credit. Brewer, Minton and Moser (2000) find that commercial banks using derivatives had more rapid growth in commercial and industrial loans over the period 1985-1992 than comparable banks not using derivatives, controlling for other factors affecting loan growth. Purnanandam (2007) finds that the lending activity of banks using derivatives was more insulated from monetary policy shocks during the period 1986-2003 than lending among banks not using derivatives. These studies suggest beneficial effects of derivatives on credit supply.

There is much less research on banks' use of credit derivatives. Minton, Stulz and Williamson (2009) show that credit derivative use among banks is highly concentrated; only 23 out of the 395 largest bank holding companies in 2005 had any transactions in credit derivatives, and virtually all of this volume occurred in just four banks. Moreover, bank credit derivative transactions in 2005 were mostly for intermediation purposes rather than hedging. The sum of net notional position of sample banks in 2005 was \$489 billion, less than ten percent of gross positions. The authors estimate that only 2 percent of sample bank loans were hedged with credit derivatives.

The literature suggests several reasons why some banks may not use derivatives to hedge credit risk on a large scale. Screening and monitoring idiosyncratic credit risk is a core competency of banks, suggesting that banks should not hedge credit risk as they would currency or interest rate risk (Diamond 1984). Moreover, adverse selection and moral hazard may make outsiders reluctant to sell credit protection at a fair price to banks with private information about particular borrowers. Banks have sought to address these concerns through a variety of means, including the establishment of informational barriers between commercial loan departments and credit derivative trading desks. Acharya and Johnson (2007) find evidence that adverse credit information about firms is revealed in the prices of credit default swaps before it is reflected in the stock market. In addition, to reduce risk at either the institutional or systemic level, those providing credit protection must have the capital and financial resources to honor their obligations. This lesson was demonstrated during the financial crisis, when banks hedged considerable amounts of subprime mortgage risk prior to the financial crisis by buying credit protection from AIG and monoline insurers. As Stulz (2010) points out, however, the effectiveness of these hedges in reducing risk was called into question when the financial health of the credit protection providers deteriorated as subprime defaults escalated. To the extent that derivatives shift credit risk from banks to less regulated and undercapitalized parts of the financial system, bank use of credit derivatives could increase systemic risk.

Large banks that trade in credit derivatives primarily as intermediaries are subject to counterparty risk. According to Stulz (2010), 63 percent of derivatives contracts in 2007 were

subject to collateral requirements, which provide protection against counterparty default. However, this means that over one-third of credit derivatives in 2007 did not have collateral protection. Moreover, collateral does not completely eliminate counterparty risk, since counterparty default could create unwanted net positions that would force the bank to replace the defaulted contracts. This could be costly given that credit derivatives are often idiosyncratic and thus illiquid. Another element of counterparty risk to dealer banks is that counterparty exposures are opaque to investors, given that most credit derivatives are not traded on organized exchanges. If a large counterparty fails, investors will be uncertain about the exposures of other dealers, and may panic. Under Title VII of the Dodd-Frank Act, more trades will be shifted to organized exchanges and central clearing will be required for a variety of other transactions, which should improve transparency and reduce counterparty risk to dealer banks.

Wagner and Nijskens (2010) examine the impact of credit risk transfer on systemic risk. Using data for a sample of banks from 1996 and 2007, the authors find that banks experienced a large and significant increase in their stock price sensitivity to market movements after they began trading credit default swaps. By separating this increased sensitivity into components due to volatility and market correlation, they find that the higher beta is due solely to an increase in the banks' correlations with the market, whereas the volatility of returns actually declines. The authors conclude that credit risk transfer reduces bank idiosyncratic risk, but actually increases systemic risk by increasing banks' exposure to aggregate risk.

OTHER NONTRADITIONAL BANKING ACTIVITIES

Commercial banks have become more reliant on nontraditional sources of income in recent decades. Stiroh (2004) documents that the share of bank revenue due to noninterest income rose from 20.4 percent in 1980 to 43.4 percent in 2000. As discussed in section B, available economic literature suggests that rising shares of noninterest income do not appear to generate diversification benefits for banks, having little or no impact on mean returns while increasing return volatility (Stiroh (2004), Stiroh (2006), Stiroh and Rumble (2006)). However, this evidence does not necessarily imply that banks and their customers derive no benefit from nontraditional activities. "Noninterest income" is a broad aggregate that includes trading revenue and fiduciary income, but also includes categories that are closely linked to traditional bank activities, such as loan commitment fees, late fees on credit card borrowers, and service charges on deposit accounts. In fact, Stiroh (2004) shows that over 62 percent of commercial bank noninterest income in 2000 was due to "fees and other noninterest income," while another 15 percent was due to "service charges." Stiroh (2004) finds that trading income has the highest volatility of any component of noninterest income, but also has the lowest correlation with interest income, which he argues may imply potential diversification benefits. Future research should isolate the diversification benefits of trading and fiduciary income, should distinguish among different types of trading activity, and should contextualize the diversification benefits of trading within the increased risk profile that some trading activity generates.

Section 619 of the Dodd-Frank Act, also known as the Volcker Rule, prohibits entities that benefit from federal insurance on customer deposits and access to the discount window from engaging in proprietary trading and from investing in or sponsoring hedge funds and private equity funds. Federal subsidies and protections that are provided to the banking industry are expressly for activities that benefit the broader economy. Section 619 requires the FSOC to release a study on the implementation of the Volcker Rule contemporaneously with this study. The Volcker study recommends a comprehensive regulatory framework to ensure that banks cease proprietary trading and inappropriate relationships with hedge funds and private equity funds. The Volcker study makes recommendations that reduce high-risk activities, but takes concrete steps to protect core banking activities, such as certain types of market making, asset management, underwriting, and transactions in government securities.

The Dodd-Frank Act also requires certain large, interconnected nonbank financial firms to hold additional capital commensurate with the added risks from trading and certain other activities. As discussed in Jorion (2007), trading banks until recently held extra capital in the form of a Market Risk Charge (MRC), set at a multiple of banks' Value-at-Risk (VaR), which in turn is an estimate of the worst-case (99th percentile) realization of 10-day trading returns. Beginning in 1998, large banks that met certain conditions were allowed to use internal models to estimate VaR. While banks have an incentive to understate VaR to reduce their MRC, regulators punish excessive exceptions (ex-post realizations that are larger than VaR) by raising the MRC multiplier; this gives banks an incentive to overstate their VaR. Berkowitz and O'Brien (2002) find that banks' VaRs from January 1998 to March 2002 were conservative relative to the ex-post empirical distribution of trading revenue, in that the fraction of exceptions is considerably below one percent. While this study suggests that banks were adequately capitalized against trading risk during the period 1998-2002, more recent studies (e.g. Basel Committee on Banking Supervision 2009) suggest that banks were not adequately capitalized against trading risk during the recent financial crisis, as banks experienced large losses on their trading books that were outside the 99 percent VaR confidence interval. The Basel III regulatory framework (Basel Committee on Banking Supervision (2010), also summarized in Hannoun (2010)) contains new risk charges that will require banks to hold roughly four times as much capital against trading book assets than under previous regulations.

In summary, the existing literature on the costs and benefits of limiting bank participation in trading and other nontraditional activities is not well developed. Future research could use more focused data on such activities and should examine the role that trading losses, hedge fund recourse or other losses from nontraditional activities played in weakening bank balance sheets during the recent crisis. Future research should also distinguish among different types of nontraditional activities, because the risks that they pose are differentiated. For instance, not all trading activity poses the same risk; future cost benefit analyses should not homogenize the relative costs and benefits of distinct kinds of trading activity. Future research should also assess the potential for other measures – such as strengthened capital or other prudential

standards – to address the potential risks of nontraditional activities at a lower cost than prohibitions.

SHADOW BANKING

Narrative histories of U.S. financial panics before and after 1933 (such as Acharya, Cooley, Richardson and Walter 2009) suggest that the core activity of banking—funding illiquid, risky, long-term assets with short-term, liquid liabilities—is subject to considerable institutional and systemic risk in the absence of a credible public backstop, because of the possibility of bank runs. Perhaps the most important regulatory innovation of the Depression era was the idea that banking is best carried out by institutions with access to explicit public backstops and subject to prudential supervision and regulation. As such, policymakers should seek to design regulations that separate banking and nonbanking activity, to limit the unintended consequence of redirecting banking activity to nonbank institutions.

As documented by Pozsar, Adrian, Ashcraft and Boesky (2010) and Gorton and Metrick (2009), a growing share of financial activity in the pre-2007 period took place in shadow banks. Examples of shadow banks include an ABCP sponsored by an investment bank, or an investment bank manufacturing ABS from a pool of underlying assets and using these securities as collateral for short-term loans financed through repurchase agreements (commonly known as repo financing). Note that in both cases, the underlying assets may be illiquid and risky, while the liabilities are short-term and liquid; thus, in functional terms, these activities are essentially banking functions—but without explicit public backstops or regulation.

Narrative and other evidence suggests that the recent crisis can be regarded in part as a run on shadow banks. As described by Brunnermeier (2009), Gorton (2008) and Kacperczyk and Schnabl (2010), the decision by BNP Paribas in August 2007 to suspend redemptions on three funds holding structured assets, following several months of bad news about subprime assets, led to sharply rising spreads and declining volumes of ABCP, as investors stopped rolling over their positions. Acharya, Schnabl and Suarez (2010) show that conduits with full credit or liquidity guarantees from commercial banks experienced smaller increases in spreads and shrank less during this period than conduits with weaker guarantees, suggesting that the credibility of credit backstopping was important to investors' rollover decisions. In subsequent weeks and months, continued deterioration of mortgage assets led to increased concerns about the solvency of banks and broker/dealers, as reflected in rising interbank lending spreads. As Gorton and Metrick (2009) show, these concerns led to rising haircuts and spreads on repo financing throughout 2008, even for repos collateralized by non-mortgage assets. As the authors discuss, repo terms in many cases depend on the solvency of the borrowing institution, even controlling for collateral quality, because some asset backed securities used as repo collateral are illiquid. If the borrower defaults on a repo, the investor would likely take a loss if he is forced to sell the collateral during a market-wide fire sale. This evidence suggests that the fragility of shadow banks was an

important reason that adverse shocks to the value of residential mortgages led to a systemic financial crisis in 2007-2008.

The Dodd-Frank Act addresses these concerns by providing government the authority to apply appropriate prudential standards to large, interconnected nonbank financial institutions that engage in banking activities, as well as the authority to apply strong risk management standards to short-term funding arrangements and address other activities that may pose risks to financial stability.

SUMMARY

The limited literature on combining traditional banking and nontraditional higher-risk operations does not support either strict separation or unrestricted mixing. Some researchers find that allowing banks to engage in nontraditional financial activities appears to have been socially beneficial. Other researchers find that removing the barriers separating bank and nonbanks appears to have increased systemic risk. In many cases, however, the evidence concerning segregation of banking and nonbanking financial activities is still quite limited, suggesting a robust agenda for future research.

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